REMARKS

In response to the Official Action of January 12, 2007, claims 1, 2, 4, 5, 7, 10, 17, 19 and 25 have been amended and claim 29 is newly submitted. The claims have been amended to delete recitation of parenthetical reference numbers. Claim 1 has also been amended to provide positive recitation for the term "samples" concerning the third vector so that reference to the samples of the third vector in the dividing action has proper antecedent basis. Claim 29 is based upon claim 23 but is written using non-means plus function terminology; such terminology being apparent to one of ordinary skill in the art from the specification as filed (e.g., page 13, lines 9-13).

Specification

At paragraph 1, the Abstract is objected to because the last line "for publication: Figure 2" is present. Appropriate correction has been made herein.

Claim Rejections - 35 USC §102

At paragraph 3, claims 1-28 are rejected under 35 USC §102(e) as anticipated in view of US patent 6,865,172, Qin. It is asserted that Qin discloses a method having actions corresponding to claim 1. For the reasons set forth below, it is respectfully submitted that Qin does not anticipate claim 1 as amended.

More particularly, the present invention is directed to a method for determining the code phase between a code modulated signal such as shown by reference element 21 in Figure 2 received at a receiver and an available replica code sequence such as shown by reference element 24. The code modulated signal 21 comprises what is referred to in the specification as a vector 21 (see specification at page 13, lines 21-27), wherein a code modulated input signal **x** is equal to a plurality of eight samples in the given embodiment.

Similarly, the replica code is also represented by a vector 24, which for the disclosed embodiment comprises eight samples. The code modulated vector is time to frequency transformed such as by a Discrete Fourier Transform (DFT) so as to yield a second vector $\mathbf{y}^1$

represented by vector 23 as shown in Figure 2. The replica code as shown by vector 24 already represents the results of such a time to frequency transform. The two vectors 23 and 24 are multiplied as shown by the multiplication operation 25 resulting in a new vector 26 also comprising the same number of samples as the number of samples in vectors 23 and 24. Vector 26 is divided into K sections 29 and in each of these sections, a sum of the samples contained therein is performed as shown by summing operation 30 so as to result in a vector $\mathbf{y}^3$ as shown by reference element 31 having a reduced size K. In the example shown K equals 4, that is, there are four samples (see specification at page 15, lines 14-17). Next, an inverse discrete frequency to time transform (IDFT) operation 27 is performed resulting in a new vector **z** which is a function of the inverse transform and the reduced vector $\mathbf{y}^3$ (see specification at page 15, lines 19-25) shown in Figure 2 by vector 28.

A method corresponding to the above-described operation of the present invention is set forth in claim 1 as amended.

The Office argues that Qin shows the dividing of the vector resulting from the multiplication of the first and second vectors into sections and summing those sections, citing Figure 3 and elements 32-33, as well as column 6, lines 23-25 of Qin.

As shown in Figure 3 of Qin, the product vector 38 resulting from the multiplication of vectors 36 and 37 is acted upon by reference element 33, which is identified as a shift means. This shift means is a multiplication operation between this product vector 38 and the convolution transformed impulse response 41 from phase means 32 and limiter 35 so as to generate an output signal 39 (see column 6, lines 27-30). It is stated in Qin at column 6, lines 20-22 that the shift means 33 results in a phase-shifted version of the product vector 38 for each delay $\tau_0, \tau_1, \ldots \tau_N$. This corresponds to the delays $\tau_0, \tau_1, \ldots \tau_N$ for the product vector 38.

In order to perform such an operation by the shift means, it is therefore necessary that the number of samples in the impulse response signal 41 be equal to the number of samples in the product vector 38 if the resulting matrix is to have the same dimension as the two input matrices (vectors)[1]. Thus, the fact that output signal 39 has the same number of delays

[1] See attached excerpt from Wikipedia which discloses ordinary matrix product operation.

(samples per delay) as the product vector 38, clearly shows that the product vector 38 has not been reduced prior to the shift means operation 33 shown in Figure 3 of Qin.

In contradistinction thereto, the present invention specifically requires dividing the third vector resulting from the multiplication of the first and second vectors, into sections and summing those sections so as to form a reduced fourth vector (see for example the embodiment shown in Figure 2 with reduced fourth vector 31). This reduced fourth vector therefore has fewer samples than the third vector. Such an operation is not shown in Qin since the output signal 39 has the same number of delay values as the product vector 38.

It is therefore respectfully submitted that Qin does not anticipate claim 1.

Since claim 1 is believed to be not anticipated by Qin, it is respectfully submitted that all of the remaining claims, including newly submitted claim 29, are also not anticipated by Qin due to their ultimate dependency from claim 1.

It is therefore respectfully submitted that the present application as amended is in condition for allowance and such action is earnestly solicited.

Respectfully submitted,

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Ordinary matrix product

By far the most important way to multiply matrices is the usual matrix multiplication. It is defined between two matrices only if the number of columns of the first matrix is the same as the number of rows of the second matrix. If A is an m-by-n matrix and B is an n-by-p matrix, then their **product** is an m-by-p matrix denoted by AB (or sometimes $A \cdot B$). The product is given by

$$(AB)_{ij} = \sum_{r=1}^{n} a_{ir}b_{rj} = a_{i1}b_{1j} + a_{i2}b_{2j} + \cdots + a_{in}b_{nj}.$$

for each pair i and j with $1 \leq i \leq m$ and $1 \leq j \leq p$. The algebraic system of "matrix units" summarises the abstract properties of this kind of multiplication.